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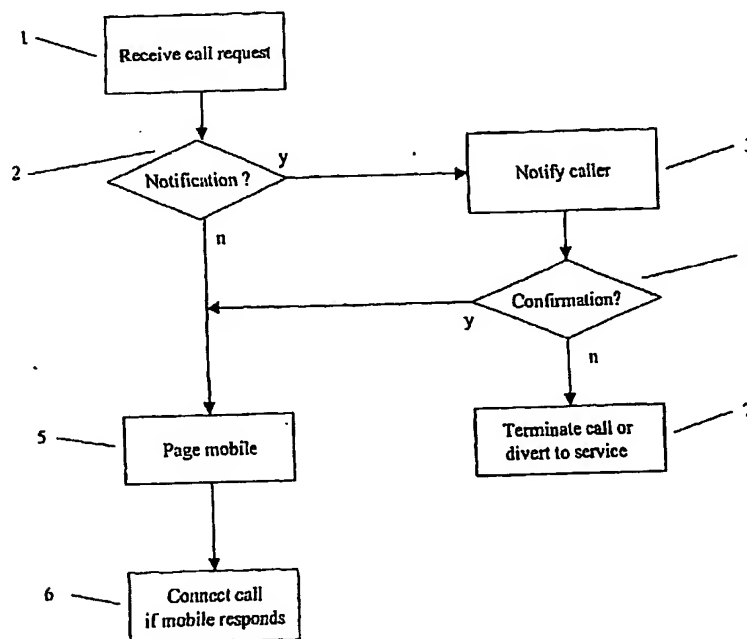
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(54) Title: **METHOD AND APPARATUS FOR CALL SET UP IN A COMMUNICATIONS SYSTEM**



(57) Abstract: The present invention relates to a method for setting up a call in a communications system in which the calling party is informed of the time at the called party's location and the call is only set up in response to confirmation from the calling party that the call should proceed, and to an apparatus for carrying out the method of the invention.

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## METHOD AND APPARATUS FOR CALL SET UP IN A COMMUNICATIONS SYSTEM

The present invention relates to a method and apparatus for setting up a call in a communications system.

### BACKGROUND TO THE INVENTION

Modern global communications systems comprise a plurality of interconnected communications systems, for example the Public Switched Telephone Network and cable networks, which provide communications services to generally fixed users, and radio or satellite communications systems, which provide communications services to mobile users. The existing Global System for Mobile communications (GSM system) and the Universal Mobile Communication System (UMTS) currently under standardisation are examples of cellular radio communications systems. The inter-connected networks form a global communications system in which it is potentially possible to contact a person wherever the person happens to be.

Although the global communications system enables a person to be contacted easily wherever they are in the world, providing great benefits to subscribers, a problem can arise in that the time at the subscriber's location is not necessarily known to a person wishing to call the subscriber. As a result, the called subscriber may receive a call at an inconvenient time.

### SUMMARY OF THE INVENTION

The present invention seeks to alleviate this problem.

In accordance with the present invention there is provided a method of setting up a call from a calling party to a called party in a communications system including

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the step of providing location-dependent notification information to the calling party in response to a request to set up a call to the called party

The present invention thus allows location-dependent notification information regarding a communications system subscriber to be provided to a person wishing to call the subscriber. This information can be used by the caller to decide whether to continue with the call, or whether to try again at a later time which is more convenient to the called subscriber.

In accordance with the present invention there is also provided a communications system apparatus for receiving a request to set up a call to a called party and for carrying out the method of the invention.

#### BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of the present invention, and to show how it may be brought into effect, reference will now be made, by way of example, to the accompanying drawings, in which:

Figure 1 is a flowchart illustrating an embodiment of the method of the invention; and

Figure 2 shows an exemplary communications system apparatus in accordance with the invention.

#### DESCRIPTION OF AN EMBODIMENT OF THE INVENTION

The present invention will now be described with reference to one embodiment of the invention.

In the description, reference is made to the Global System for Mobile Communications (GSM system) as an exemplary communications system:

however, it will be clear to a skilled person that the invention is also applicable to other communications systems, and is not intended to be limited to the existing GSM system.

The GSM network is a cellular radio communication system comprising a plurality of interconnected base stations which each provide communications coverage to mobile stations in a corresponding cell. The mobile stations are able to move freely within the area covered by the GSM network and so periodically move between cells. A subscriber to a first network (the "home network") is able to make and receive calls when in an area covered by another network, for example in a different country, (when "roaming") by means of reciprocal agreements between the home network and the other network. Owing to these reciprocal agreements between GSM network operators in different countries, as discussed above, communications services can be provided to a mobile station effectively on a global basis.

Clearly the GSM network must be kept informed of the location of a mobile station as it moves between cells in order that calls to the mobile station are routed efficiently to the base station of the cell in which the mobile station is currently located (the serving base station). This is achieved in the GSM system by requiring a mobile station which is switched on but not currently making or receiving a call (in an idle state) to periodically inform the serving base station of its presence. This location information is stored in a Location Register held by the home network of the mobile station.

When a call is to be set up to a mobile station the Location Register held by the home network of the mobile station is accessed and the serving base station is identified. As explained above, the serving base station could be anywhere in the world covered by the GSM network. The mobile station is paged through the identified serving base station and, if the mobile station responds, the call

between the calling party and the mobile station is set up in the normal manner, which will be familiar to a skilled person.

The method of the present invention will now be explained with reference to the GSM system as an exemplary embodiment.

As shown in Figure 1, when a call request to set up a call to a subscriber's mobile station is received (step 1) it is determined whether or not location-dependent notification information should be sent to the calling party (step 2). If so, location dependent notification information is sent to the calling party in step 3.

This determination is preferably made on the basis of the location of the called party, and in particular on the current time at the caller's location. So, for example, location dependent notification information may be provided to a caller if the time in the called subscriber's location is "unsociable" e.g. between 11pm and 7am. Alternatively or additionally, location dependent notification information may be provided to a caller only if the caller and the called subscriber are in different time zones.

Advantageously, the provision of location-dependent notification information on call set-up can be offered as an additional service to subscribers of a network, so that each subscriber may choose whether to subscribe to the service or not. It is particularly advantageous if a subscriber can select whether or not the service is activated or de-activated at any time. Clearly, in this case it is preferable that the subscriber can check easily whether or not the service is activated. In addition it may be desirable for the subscriber to be able to alter parameters of the notification service, for example to specify what times are to be considered "unsociable".

It is clearly possible to implement a system in which the location-dependent notification information is provided during the set up of all calls (in which case step 2 of Figure 1 would be eliminated and step 3 would follow on directly from step 1 of Figure 1). However, this arrangement is considered less advantageous since most calls are made within the same country or within the same timezone. In this situation the provision of location dependent location information merely introduces extra complexity into the call set-up procedure.

The location-dependent notification information preferably relates to the current time at the called party's current location. This information might be provided directly, by providing the time at the called party's current location as the location-dependent notification information, or indirectly, for example by providing an indication of the time difference between the called party and the calling party, or between the called party and the called party's home network, as the location-dependent notification information.

Alternatively or additionally, the location-dependent notification information may relate directly to the location of the called party, for example, information relating to whether or not the called party is roaming, information relating to the country in which the called party is located, or information relating to the network on which the called party is currently registered.

On receipt of the location dependent notification information, the calling party confirms whether or not to proceed with the call set up as indicated by step 4 of Figure 1. The confirmation may be achieved in a number of different ways, as will be clear to a skilled person, for example by means of a key press.

If the calling party confirms that the call set-up should proceed, the called party is paged (step 5) and the call is set up if the called party responds (step 6) in accordance with the standard call set-up procedure. The standard call set-up procedure is known to a skilled person and so will not be explained further.

If the calling party does not confirm that the call should proceed, the call is terminated or may be diverted to another service, for example to voice mail or to a diversion number (step 7).

Clearly, it may be desirable for a subscriber to choose to "block" calls during certain periods, and so in an embodiment of the invention the call is terminated or diverted automatically during certain periods, without allowing the calling party the opportunity of confirming that the call should proceed. In this situation step 4 is omitted and step 7 follows step 3 in Figure 1. Thus the subscriber can ensure that calls at night are diverted to voice mail without needing to remember to switch a voice mail service on and off each night.

An exemplary illustration of the method of the invention as outlined above will now be given. Thus, if a request is received to set up a call to a subscriber in France when the local time in France is 3am, the calling party might receive a notification such as:

"Customer XX is currently in France where the local time is 3am. Please press 1 to continue or hang up to end call"

If the subscriber has a voice mail or call diversion facility, the calling party might receive a notification such as:

"Customer XX is currently in France where the local time is 3am. Please press 1 to continue; press 2 to divert to voice mail; press 3 to divert to [call diversion number] or hang up to end call"

It is particularly advantageous if the location information already known by the network, such as the information stored in the Location Register of the subscriber



network, is used to determine whether or not location-dependent notification information should be sent to the calling party.

An exemplary embodiment of a communications systems apparatus for carrying out the method of the invention is shown in Figure 2.

The communications system apparatus shown in Figure 2 comprises a call control means 10 for handling call set up requests. The call control means 10 comprises a call set up means 11 and a notification information supply means 12. The call set up means 11 and the notification information supply means 12 are both connected to a storage means 13 which stores location information and which may also store subscriber service information. The storage means 13 may be at a location remote from the call control means 10 or may be part of the same apparatus, as is clear to a skilled person.

When a call set up request is received, the notification information supply means 12 is informed of this by the call set up means 11. The notification information supply means 12 obtains location information of the called subscriber from the storage means 13, determines location-dependent notification information on the basis of the location information, and sends the location-dependent notification information to the calling party. On receipt of confirmation to proceed from the calling party, the call set up means 11 sets up the call to the called subscriber using the location information in the storage means 13.

In an exemplary embodiment the communications systems apparatus may be a base station apparatus of a mobile communications system: however, it will be clear to a skilled person that the method of the invention may be carried out by a number of different apparatus within a communications system.

In addition, in Figure 2 the call set up means and the supply means are shown as separate whereas in general these different functional blocks will be implemented in software.

CLAIMS

1. A method of setting up a call from a calling party to a called party in a communications system including the step of providing location-dependent notification information to the calling party in response to a request to set up a call to the called party.
2. The method of setting up a call as claimed in claim 1, wherein the method also comprises the step of receiving confirmation from the calling party to proceed with the call before the continuing with setting up the call to the called party
3. The method of setting up a call as claimed in claim 1 or 2, wherein the location-dependent notification information is provided to the calling party only when the called party is not registered on its home network.
4. The method of setting up a call as claimed in any preceding claim, wherein the location-dependent notification information is derived from the called party location information stored by the communications system.
5. The method of setting up a call as claimed in one of claims 1-4, wherein the location-dependent notification information relates to the location of the called party.
6. The method of setting up a call or the mobile communications system apparatus as claimed in claim 5, wherein the location-dependent notification information relates to whether or not the called party is roaming.
7. The method of setting up a call as claimed in claim 5 or 6, wherein the location-dependent notification information relates to the country in which the called party is located.

8. The method of setting up a call or the mobile communications system apparatus as claimed in one of claims 5-7, wherein the location-dependent notification information relates to the network on which the called party is currently registered.

9. The method of setting up a call as claimed in one of claims 1-8, wherein the location dependent notification information relates to the time in the time zone in which the called party is located.

10. The method of setting up a call as claimed in claim 9, wherein the location-dependent information relates to the time difference between the calling party time zone and the called party time zone.

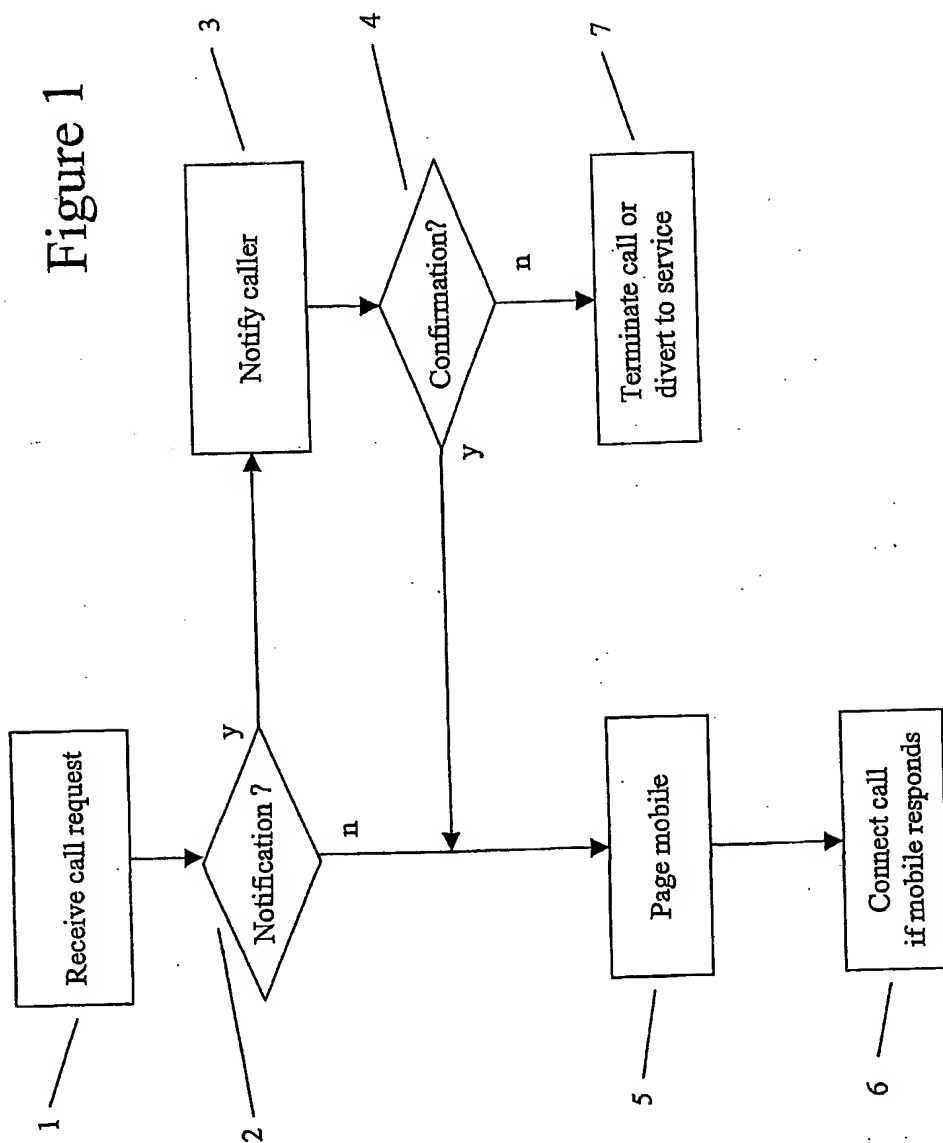
11. The method of setting up a call as claimed in claim 10, wherein the location-dependent information relates to the time zone in which the called party is located.

12. Communications system apparatus, comprising means for receiving a request to set up a call to a called party and for carrying out the method as claimed in any preceding claim.

13. The communications system apparatus as claimed in claim 12 wherein the communications system apparatus is a base station apparatus in a mobile communications system.

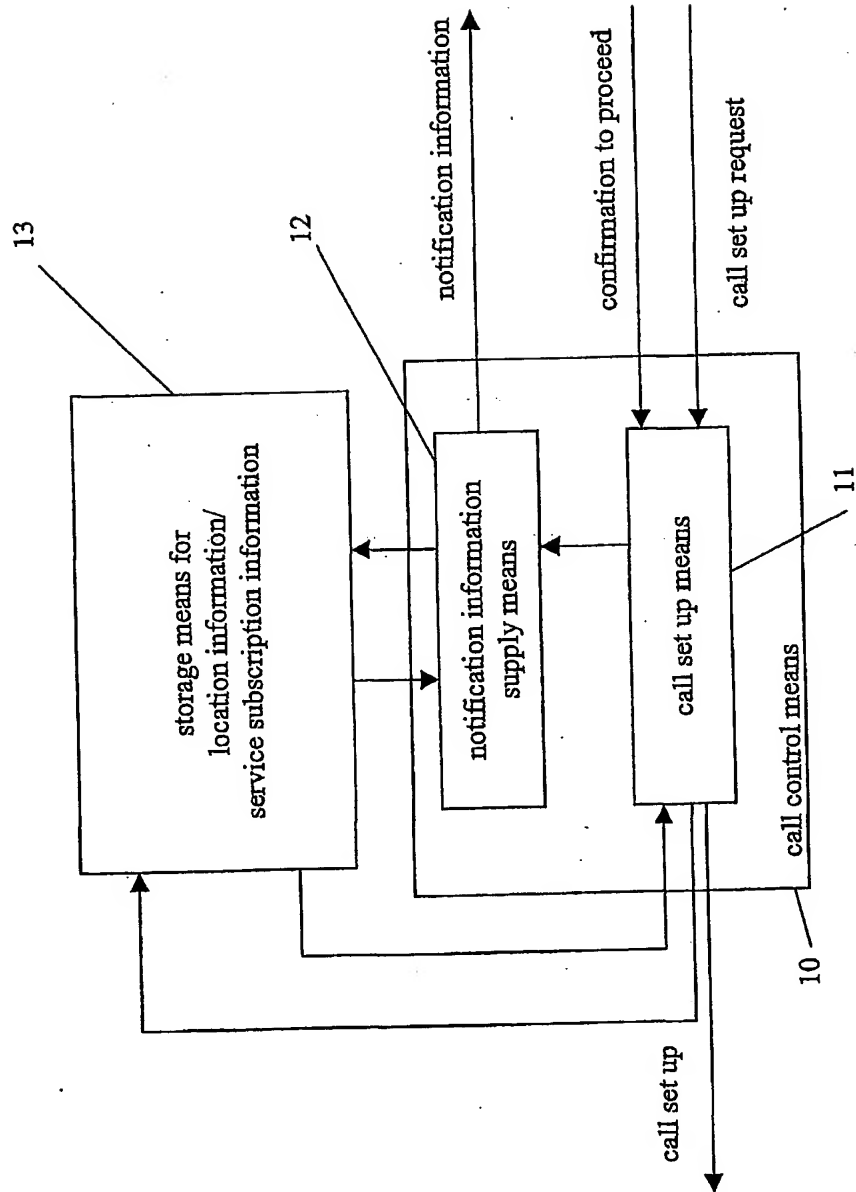
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Figure 1



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Figure 2



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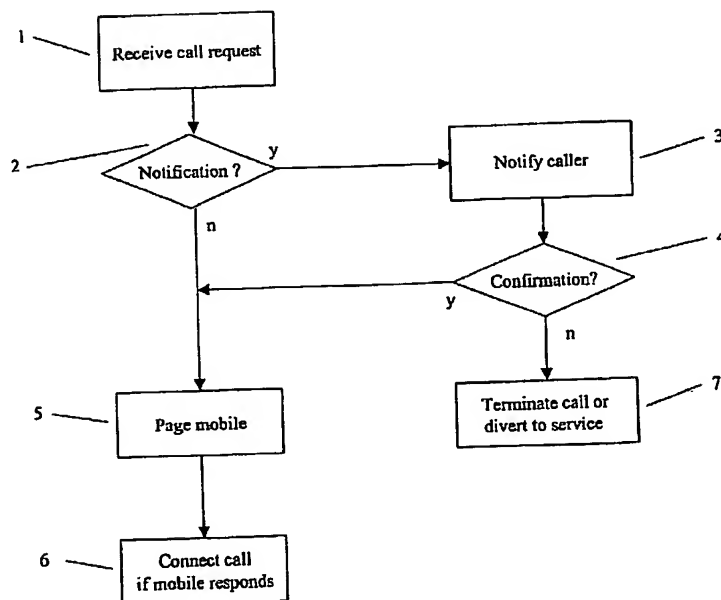
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Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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Information on patent family members

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